WINTER WEATHER AWARENESS

A Campaign by the
National Weather Service
Tennessee Emergency Management Agency
North Carolina Emergency Management
Virginia Department of Emergency Services

Tennessee November 14-16, 2006
Virginia December 3-9, 2006
North Carolina December 3-9, 2006

Winter is approaching. Hazardous weather can strike with little notice. Tornadoes strike with unwanted regularity. As winter approached four years ago, Tennesseans experienced the secondary severe weather maximum at its worst with the Veterans Day Tornado outbreak. Severe thunderstorms with downburst winds and large hail occur even more frequently. Floods and flash floods can wash people and property away with little notice.

The National Weather Service and the State Emergency Management Agencies would like to bring another weather threat to the forefront and heighten everyone's awareness of this significant weather threat – Winter Weather.

Last winter was somewhat mild with a few small snow events and several significant snow events across the southern Appalachians. January 16th 2003 saw a snowstorm move across the southern Appalachian region with 4 to 8 inches of snow in many areas. Ample forecast and warning time allowed road crews to react an prevent major problems.

The winters prior to last year were relatively mild across the region and lulled everyone into a feeling that those were what a "Normal" winter is like. The Christmas Eve 1998 ice storm caused over 17 million dollars of damage and widespread transportation problems. The winter of 95-96 saw many areas of the Southeastern U.S. experiencing a number of very heavy snow and ice storms. Heavy snow or ice can trap people in their homes or automobiles. People are inconvenienced, injured or even killed.

Even without snow or ice, intense cold can injure or kill before a person is aware they are at risk. Fatalities from hypothermia have occurred in air temperatures of 40-50 degrees. Persons with certain chronic health conditions and those over 65 are more at risk for hypothermia, **even within the home.**

One hazard we do not often associate with winter is flooding. Floods occur when too much rain or melted snow fill river or creek basins too quickly. Along Tennessee's rivers and streams, flooding is a natural part of life and most common during winter and early spring. Frozen ground, sparse vegetation, and less evaporation are all factors that allow water to run off the land and reach the rivers quickly during the cold months.

The States of Virginia and North Carolina will highlight Winter Awareness during the week of December 3rd-9th. The National Weather Service in Morristown and the Tennessee State Emergency management Agency will highlight November 14th-16th to bring these hazards to the attention of the public. We will be sending information through our communications network including the National Weather Service's NOAA Weather Radio during this period. We hope you will all join in this effort to make this the safest winter possible.

From the Meteorologist in Charge—George Mathews

As the leaves have changed and the weather has cooled, I've heard people say things ranging from, "We're due this winter" to "Winters never get that bad around here any more". I'm sure you're all wondering what kind of a winter it will be this year. The Climate Prediction Center (CPC) is forecasting our area to be near normal in both temperature and precipitation--with maybe a slight hint toward temperatures being a little warmer than average and precipitation being a little below average. Don't let these forecasts get you too excited that it will be a mild winter--remember that the winter forecast is a period totaling 90 days and any major event that paralyzes the area will only affect the temperature and precipitation data for maybe 2-5 of those 90 days.

Got a little quiz for you: Over a winter (December through February) if you get 10 inches of rain and 3 inches of snow, what is your measured precipitation for that winter? a) 10 inches b) 13 inches c) none of the above

In calculating the precipitation, any snow is measured and reported as a snow depth, etc., but then a sample of the snow is melted and remeasured as liquid because snow is fluffy and becomes much deeper quickly. A default ratio is 10 inches of snow per inch of liquid (rain), so in the above question, the 3 inches of snow may melt to about 0.3 inch liquid, so the answer to the above situation would be 10.3 inches, resulting in choice "c" above as the correct choice ("none of the above").

In our area, precipitation (rain and melted snow) amounts average 10-15 inches for the winter months for the lower elevation population centers. Using the above ratio of 10 inches of snow for every 1 inch of liquid, if all the precipitation fell as snow, these winter totals would balloon to 100-150 inches of snow!--pretty scary, huh! What I'm getting at here is that we have ample precipitation every winter to get buried in big snows--it's only a matter of whether it is cold enough for the precipitation to fall as snow.

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Know the Threat!!

Snow and Freezing Rain

Heavy snow and/or freezing ran can immobilize a region and paralyze a city. Accumulations of snow can collapse buildings and knock down trees and power lines. Rural areas may be isolated for days. It is recommended that each household have provisions and the ability to remain self-sufficient for at least 3 days without power, or help, as it may take this long to reopen main roads and reestablish vital services.

Wind Chill

Wind Chill is based on the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. Animals are also affected by wind chill. The biggest question that always comes up with wind chill is, does it affect water pipes and car radiators. The answer is no, the accelerated loss of heat occurs on exposed skin only.

Hypothermia

Warning Signs

Uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and apparent exhaustion.

Detection

Take the person's temperature. If below 95 degrees F, immediately seek medical care. This is a life threatening situation. If care is not immediately available, begin warming the person slowly. Warm the core first. Get the person into warm clothing and wrap them in a warm blanket covering the head and neck. Do not give the person alcohol, drugs, coffee, or any very hot beverage or food, warm broth is better. Do not warm the extremities first, this drives cold blood toward the heart and may cause heart failure.

Frostbite

Frostbite is damage to body tissue caused by the tissue being frozen. Frostbite causes the loss of feeling and a white or pale appearance in extremities, such as fingers, toes, earlobes, or the tip of the nose. If symptoms are detected, get medical help IMMEDIATELY. If you must wait for help, slowly re-warm affected areas. If the person is also showing signs of hypothermia, warm the body core before the extremities.

Flooding

Winter is approaching and in addition to being cold and possibly snowy, it's also the flood season. Leaves are beginning to fall off the trees, and the ground will either freeze or potentially become substantially wet. Leaves trap rain and regulate the rater at which it hits the ground and sinks in. Less leaves = more rain hitting the ground faster. Wet or frozen soils can hold much less water than dry ones, and so more water hitting the ground means more runoff, instead of percolating down into the water table. More runoff = more flooding.

The summer of 2005 was relatively wet, however late summer into fall has been pretty dry. The overall rainfall for the year 2005 to date has been much below normal over most of the area. Hence, soils are dry and there is more room for water storage in the reservoirs and water table than in normally available. The outlook for autumn and early winter flooding is lower than normal. BUT…remember that one or two big rainfall events around these parts can change that picture completely. Remember the autumn of 2004 when four tropical storms moved across the region and soaked us down good. You always need to be on the lookout for potential flood problems. Even very dry top soil will enable flooding if enough rain falls at once.

Rules of safety in rain events are:

- Keep an eye on bodies of water at all times
- Pay attention to the weather where you are AND upstream from you
- NEVER drive through water running over the road
- Even after the rain, flooding may have secretly undermined roads beds

If you come to a closed or flooded road, TURN AROUND! DON'T DROWN! Don't make law enforcement officials have to go looking for you next of kin.

If you follow these simple rules, you will never have to say, "The flood came up so fast, we had no warning!"

Before the Storm—Know the Terms

A **Winter Weather Advisory** is issued when ice or snow is expected to hinder travel, but conditions are not serious enough to require warnings.

Freezing rain is forecast when expected rain is likely to freeze as soon as it strikes the ground, potentially creating a coat of ice on roads and walkways. Sleet consists of small particles of ice mixed with rain. Sleet causes roads to freeze and become slippery.

A **Winter Storm Watch** means that severe winter weather is possible within the next day or two.

A **Winter Storm Warning** means that severe winter weather conditions are expected within the next 24 hours. A blizzard warning means that heavy snow and winds of 35 mph or more are expected.

Be Prepared – Keep a battery powered radio and flashlights in working order, stock extra batteries.

Before the Storm—Preparations

Be Prepared – Keep a battery powered radio and flashlights in working order, stock extra batteries.

Store drinking water and have food that can be prepared without an electric or gas stove. Stock emergency water and cooking supplies. Have candles and matches available in case of a power outage. Be careful how you use them.

Be certain that needed medications are available.

Be Prepared for isolation at home – Make sure you have sufficient heating fuel; regular fuel sources may be cut off. Have some kind of emergency heating equipment and fuel so that you can keep at least one room warn, but do NOT use a gas fired grill inside the home. Take measures to protect plumbing from freezing. Contact local utilities for winter tips.

Keep your car or truck "winterized" - Winterizing includes being certain about antifreeze protection levels and use a gasoline additive to reduce gasoline freezing. Carry a "Winter Car Kit" that includes high energy foods, a windshield scraper, flashlight, tow rope or chain, shovel, tire chains, blanket, bag of sand or salt, fluorescent distress flag and an emergency flare – all in case you're trapped in your vehicle by a winter storm. Keep extra gloves, mittens, hats, earmuffs and outerwear in the vehicle throughout the winter.

During the Storm

Stay Informed – Listen to radio or television for updates on weather conditions. With early warning, you may avoid being caught in the storm, or at least be better prepared to cope with it.

Dress for the season : Avoid getting wet – Many layers of thin clothing are warmer than a single layer of thick clothing. Mittens are warmer than gloves. Wear a hat; most body heat is lost through the top of the head. Cover your mouth to protect lungs; don't directly inhale extremely cold air.

Overexertion can bring on a heart attack – a major cause of death during and after winter storms – If shoveling snow isn't critical, don't do it. If you must shovel, don't overexert yourself.

If you are isolated at home – Conserve fuel by keeping your house cooler than usual and by "closing off" heat to some rooms. When kerosene heaters are used, maintain ventilation to avoid toxic fumes. Use only the fuel recommended by the manufacturer and follow operating instructions. Use a carbon-monoxide detector/ alarm and a smoke alarm.

Do Not Drive into Worsening Conditions – If you must travel, take winter driving seriously. Travel by daylight, and keep others informed of your schedule. Drive with extreme caution. Never try to save time by driving fast or by using back-road shortcuts.

If a Blizzard traps you in your vehicle – Pull off the highway, stay calm and remain in your vehicle where rescuers are most likely to find you. Set your directional lights to "flashing" and hang a cloth or distress flag from the radio antenna or window.

Do not set out on foot unless you can see a building close by where you know you can take shelter. Be careful: distances are distorted by blowing snow. A building may seem close, but actually may be too far away to walk to in deep snow.

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Trapped in a Vehicle

If you run the engine to keep warm, open a window slightly for ventilation. This will help protect you from possible carbon monoxide poisoning. Periodically clear away snow from the exhaust pipe.

Exercise to maintain body heat, but avoid overexertion. In extreme cold, use road maps, seat covers, and floor mats for insulation. Huddle with passengers and use your coats as blankets.

Never let everyone in the car sleep at one time. One person should always be awake to look out for rescue crews.

Be careful not to use up all battery power. Balance electrical energy needs – the use of lights, heat and radio with supply. At night, turn on the inside dome light, so work crews can spot you.

If in a remote area:

Spread a large cloth or the vehicle floor mats on the snow to attract rescue personnel who may be surveying the area from above. Once the blizzard passes, you may need to leave the car and proceed on foot to better shelter.

Keeping in Touch After any disaster, friends, relatives, insurance adjusters, etc. may need to locate you and your family. The following tips may reduce the confusion associated with making contact:

Evacuations

(1) Before evacuating your home, establish a contact person (and phone number) out of the potential disaster area where friends and relatives should "check-in" with each other.

(2) When you evacuate, consider leaving a note, securely attached to the front door, telling where you can be reached – but only if you have reason to believe someone might come looking for you.

(3) If widespread damage occurs, insurance adjusters or others might have trouble identifying your home or finding you. After the danger is over, therefore, consider spray painting the following information somewhere that is highly visible: Name, address, insurance company, policy number and contact number

	December	January	February	Season
Bristol				
Normal High Temp	47.8	44.1	48.9	46.9
Normal Low Temps	26.8	24.3	27.0	26.0
Normal Temperatures	37.3	34.2	38.0	36.5
Normal Precipitation	3.39	3.52	3.40	10.31
Normal Snowfall	2.2	5.5	4.1	11.8
Knoxville				
Normal High Temperature	49.8	46.3	51.7	49.3
Normal Low Temperature	31.9	28.9	31.8	30.9
Normal Temperature	40.9	37.6	41.8	40.1
Normal Precipitation	4.49	4.57	4.01	13.07
Normal Snowfall	0.7	3.7	3.0	7.4
Chattanooga				
Normal High Temperature	52.0	48.8	54.1	51.6
Normal Low Temperature	32.7	29.9	32.6	31.7
Normal Temperature	42.4	39.4	43.4	41.7
Normal Precipitation	4.81	5.40	4.85	15.06
Normal Snowfall	0.1	2.0	1.3	3.4

Records

All Time Cold Temperatures

Chattanooga	-10	Feb 13, 1899, 1/31/1966 1/21/1985
Knoxville	-24	Jan 21, 1985
Tri-Cities	-21	Jan 21, 1985

Coldest Average Winter

Chattanooga	34.8	1962-63
Knoxville	34.2	1963-64
Tri-Cities	30.0	1976-77, 1977-78

Coldest Monthly Average

	Dec		Jan		Feb	
Chattanooga	34.3	1917	28.5	1977	33.8	1895
Knoxville	29.2	1876	26.7	1940	30.5	1895
Tri-Cities	27.8	1963	22.1	1977	28.1	1958

Snowfall

	Dec		Jan		Feb		Mar		Seasonal	
Chattanooga	14.8	1886	15.8	1893	17.3	1895	20.0	1993	23.9	1894-95
Knoxville	25.4	1886	15.1	1962	25.7	1895	20.2	1960	56.7	1959-60
Tri-Cities	12.9	1963	22.1	1966	20.4	1979	27.9	1960	51.0	1959-60

24 Hour Snowfall

Chattanooga	12.0	1886	10.2	1988	9.9	1912	20.0	1993
Knoxville	8.9	1969	12.0	1962	17.5	1960	14.1	1993
Tri-Cities	9.6	1969	13.0	1996	11.5	1996	14.2	1993

MIC from page 2

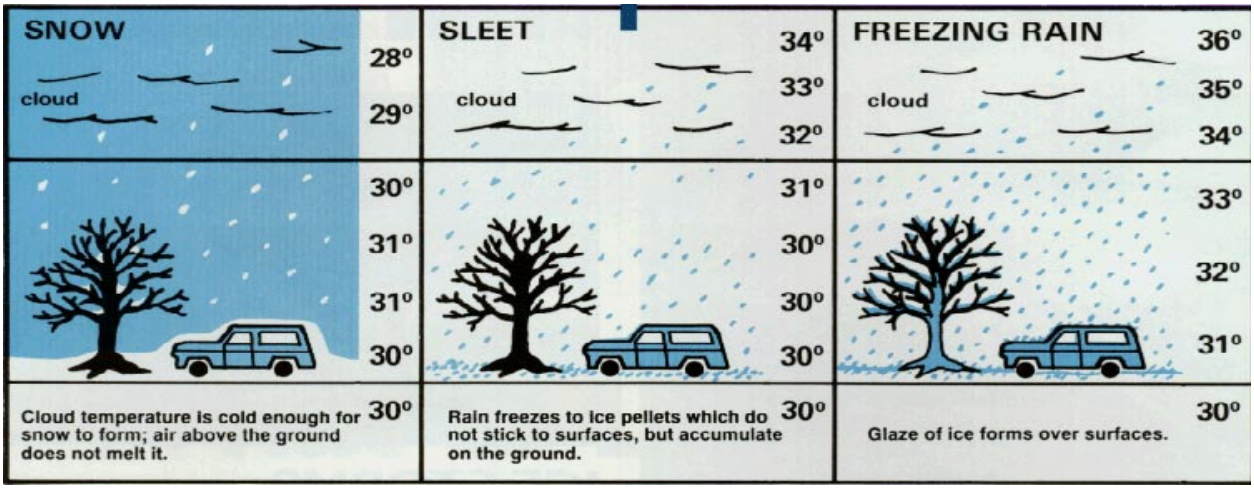
The last few years it just hasn't been quite cold enough (at least in the lower elevations) to get many deep snows--but it's been close. Last year on a Saturday morning, we had a situation in which the freezing level was hovering at an elevation aloft to we were getting spits of rain, sleet, and tiny snow flakes on my windshield here in Morristown (about 1300 feet elevation), but I knew the situation, so I took a quick sprint (in the car) up to the top of Crockett Ridge (1952 feet--still in the Morristown city limit). About 2/3 the way up my 5 minute drive all the "pecks" and "pings" of sleet and rain ceased in favor of all snow. A beautiful winter scene covered the upper 200 feet of the ridge with about 3/4 of an inch of snow accumulated at that time and 3 inches by the end of the event--even though the bulk of the city 600 feet below remained brown and wet. Elevation plays a huge role in winter precipitation and forecasting. For many events in the winter if it's not snowing where you are, you may just need to climb about a 1000 feet to play in the snow.

So in summary, please do not let your guard down! The most prepared communities for a disaster are the ones who experienced a disaster last year; alternatively, often the least prepared communities are the ones who haven't had a disaster in a long time--let's act like we're going to get a 15-inch snow or 3 inches of ice and plan accordingly! The precipitation will be here--if the temperatures "zig" this year instead of "zag", we could get a big one!

I want to wish all of you a safe and happy holiday season!!!
Keep in touch,

George

Cloud Base



Snow

Flurries: Light snow falling for short durations. No accumulation or light dusting is all that is expected.

Showers: Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

Squalls: Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant. Snow squalls are best known in the Great Lakes region.

Blowing Snow: Wind drivensnow that reduces visibility and causes significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground that is picked up by the wind.

Blizzard: Winds over 35 mph with snow and blowing snow reducing visibility to near zero.

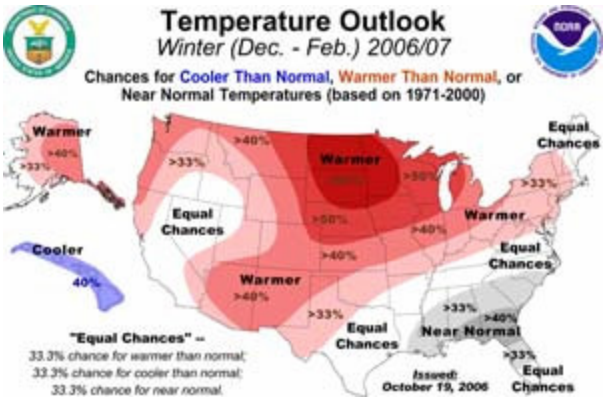
Sleet

Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects. However, it can accumulate like snow and cause a hazard to motorist.

Freezing Rain

Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Even small accumulations of ice can cause a significant hazard.

NOAA U.S. WINTER OUTLOOK **Entire text at http://www.noaanews.noaa.gov/stories2006/s2724.htm**

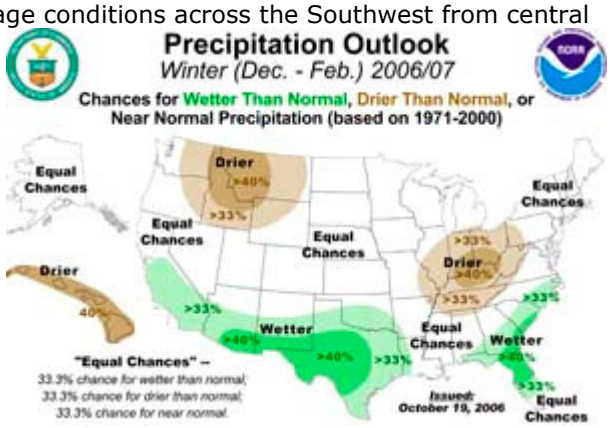


Oct. 19, 2006 — Meteorologists at the NOAA Climate Prediction Center released the latest seasonal outlook, which reiterates this winter is likely to be warmer than the 30-year norm (1971-2000) over much of the nation, yet cooler than last year's very warm winter season. NOAA's heating degree day forecast for December, January and February projects a two percent warmer winter than the 30-year average but about eight percent cooler than last year. Meanwhile, a strengthening El Niño event continues to develop in the equatorial Pacific. Although there has been early season snowfall in Buffalo and wintry weather in the upper Midwest and Rockies this month, NOAA's seasonal meteorologists say there is not much correlation between fall weather and the winter season.

The Seasonal Outlook

Overall, for December 2006 through February 2007, seasonal forecasters expect warmer-than-average temperatures across parts of the West, Southwest, Plains states, Midwest, parts of the Northeast and northern mid-Atlantic region, as well as most of Alaska. Near-average temperatures are favored for parts of the Southeast, while below-average temperatures are anticipated for Hawaii. Maine, the southern mid-Atlantic region, the Tennessee Valley, much of Texas and California, and the intermountain West have equal chances of warmer, cooler, and near-normal temperatures this winter. "Cooler-than-normal winter temperatures over Hawaii are still quite mild, with highs in the major cities expected to be in the 70s," said Michael Halpert, head of forecast operations at the NOAA Climate Prediction Center.

The precipitation outlook calls for wetter-than-average conditions across the Southwest from central and southern California to Texas and for Florida and the south Atlantic Coast. Drier-than-average conditions are favored in the Ohio Valley, the northern Rockies and Hawaii. Other regions have equal chances of drier, wetter or near average precipitation.

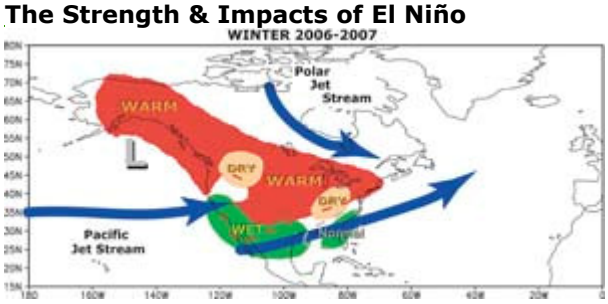


(For the seasonal outlook, temperature and precipitation averages vary from location to location and are based on the 1971-2000 time period.)

NOAA's Seasonal Drought Outlook, also updated today, reflects the pattern of rainfall expected this winter. This pattern is expected to improve drought conditions across Arizona, Texas, portions of the Plains and Southeast. Drought is predicted to develop across parts of Idaho, Washington and Oregon.

For more information contact the National Weather Service at (423) 586-3771 or e-mail Howard.waldron@noaa.gov , regular mail 5974 Commerce Blvd; Morristown, TN 37814, or your **LOCAL** Emergency Management Director.

The Strength & Impacts of El Niño



At present, weak El Niño conditions (warmer-than-average sea surface temperatures in the tropical Pacific, and other indicators) have developed across the tropical Pacific during the past few months. Current conditions and various forecasts imply that El Niño conditions may strengthen during the next few months. "However, this event is not expected to reach the magnitude of the very strong 1997-1998 El Niño episode," said Vernon Kousky, research meteorologist at the NOAA Climate Prediction Center.

El Niño events influence the position and strength of the jet stream over the Pacific Ocean, which in turn affects the winter precipitation and temperature patterns across the country. The NOAA Climate Prediction Center is responsible for forecasting and monitoring El Niño events for the U.S. Over the years, NOAA scientists have found that there tends to be some variety in impacts among El Niño events. The stronger the event, the more likely it becomes that much of the nation will experience a warmer than average winter. However, it is important to note, "El Niño does not always mean impending disaster," he added.

The Good and Bad Sides of El Niño

The state of Florida illustrates most reliably the good and bad sides of El Niño. For example, scientists at the Center for Ocean-Atmospheric Prediction Studies at Florida State University, a NOAA partner, note that during El Niño winters the probability of severe freezes in the Southeast is very low. Major freezes in central Florida in the last 100 years occurred during El Niño Southern Oscillation, ENSO, neutral years. The threat of wildfires and drought also are greatly reduced in Florida due to expected above normal precipitation.

However, studies conducted at the NOAA National Weather Service field office in Melbourne, Fla., find when there is an El Niño event there is an increase in severe weather activity during the winter and spring for Florida. Floridians should remember in later winter and spring killer tornadoes tend to occur late at night and NOAA Weather Radio can be an invaluable tool for alerting people of potential danger after they've turned off the TV and gone to bed.

The NOAA National Weather Service has a variety of weather safety information online to help keep you safe. The NOAA Climate Prediction Center will issue its final U.S. Winter Outlook for the 2006-2007 season on November 16, 2006.

In 2007 NOAA, an agency of the U.S. Commerce Department, celebrates 200 years of science and service to the nation. Starting with the establishment of the U.S. Coast and Geodetic Survey in 1807 by Thomas Jefferson much of America's scientific heritage is rooted in NOAA. The agency is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and information service delivery for transportation, and by providing environmental stewardship of the nation's coastal and marine resources. Through the emerging Global Earth Observation System of Systems (GEOSS), NOAA is working with its federal partners, more than 60 countries and the European Commission to develop a global monitoring network that is as integrated as the planet it observes, predicts and protects.

Relevant Web Sites

NOAA Climate Prediction Center Seasonal Outlooks http://www.cpc.ncep.noaa.gov

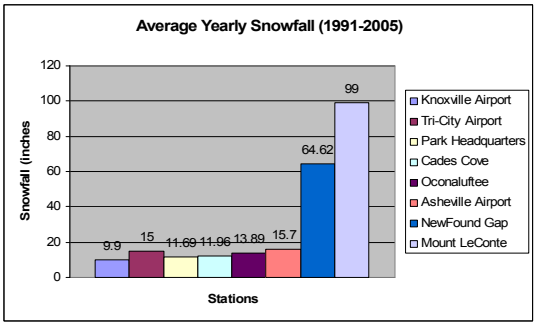
Winter Weather Preparedness http://www.weather.gov/om/winter/index.shtml

NOAA Drought Information Center http://www.drought.noaa.gov/

Great Smoky Mountain National Park
Snowfall Analysis

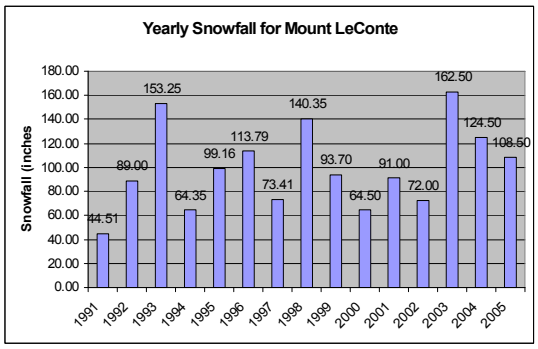
by David Hotz

The Great Smoky Mountain National Park contains some of the most diverse terrain in the eastern United States. Elevations in the park range from 875 to 6,643 feet. The National Weather Service Office at Morristown has the responsibility for issuing forecasts for the Tennessee side of the park. The GSMNP is one of the most visited national parks in the United States with a variety of outside activities, such as hiking, camping, fishing, and sightseeing.



The main road across the park is U.S. highway 441, which crosses NewFound Gap at an elevation of 5048 feet MSL.

The average yearly snowfall shows a large variation between the lower terrain stations, such as Park Headquarters, and the higher terrain stations, such as NewFound Gap and Mount LeConte. The difference between Park Headquarters and Mount LeConte is around 90 inches. The lower terrain locations receive an average yearly snowfall around 12 inches with Mount LeConte's average is nearly 100 inches.



The average snowfall for the park's lowest elevations stations, which are Park Headquarters and Cades Cove, is only about 2 inches more than the Knoxville Airport.

Mount LeConte average snowfall over the last 15 years is nearly 100 inches, but a graph of yearly snow accumulation shows a wide range. The minimum snowfall was less than 45 inches in 1991 with the greatest accumulations reported in 2003 with over 160 inches.

Snowfall data shows several years when the lower elevations stations received an inch or less of snow accumulation for the entire year. The least yearly snowfall was only a trace at Cades Cove in 1992 and Oconaluftee in 2005.

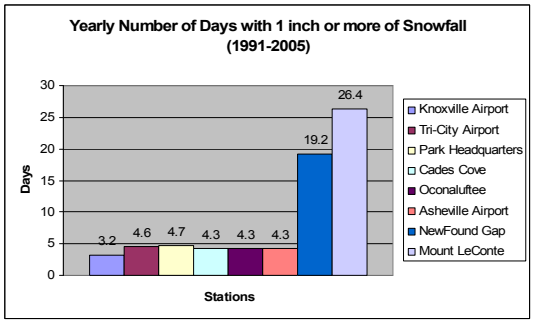
The snowiest year for the entire park was 1993, which was the year of the Super-Storm, with an overall average snowfall for the 5 stations being almost 75 inches. The year with the least snowfall was 1991 with a 5 station average of less than 20 inches.

	Park Headquarters	Cades Cove	Oconaluftee	New-Found Gap	Mount Le-Conte
1991	2.50	7.50	9.75	33.87	44.51
1992	1.00	0.00	1.00	50.25	89.00
1993	24.00	34.00	57.00	106.55	153.25
1994	7.75	10.75	2.25	45.25	64.35
1995	12.13	9.15	9.79	58.27	99.16
1996	29.84	36.29	29.96	90.03	113.79
1997	15.00	12.45	12.52	47.76	73.41
1998	15.70	5.75	4.25	77.75	140.35
1999	7.55	3.00	11.75	62.10	93.70
2000	9.00	8.05	17.70	45.60	64.50
2001	10.00	10.00	6.00	54.50	91.00
2002	6.20	5.50	6.00	43.50	72.00
2003	18.00	15.00	23.00	98.00	162.50
2004	5.00	10.00	3.50	88.50	124.50
2005	4.50	1.00	0.00	58.50	108.50

The average number of days per year with snowfall of 1 inch or more varied from 4 and 5 across the lower elevation stations to 26 at Mount LeConte (Fig. 5). The yearly number of days of snowfall at NewFound Gap is around 19, which is similar to the normal 18 snowfall days at Minneapolis Saint Paul, Minnesota.

Monthly and Daily Snowfall

The monthly average snowfall shows a wide range from the lower elevation stations and the park higher terrain stations. Overall, the snowiest month across the park is January with the highest average monthly snowfall around 25 inches at Mount LeConte.

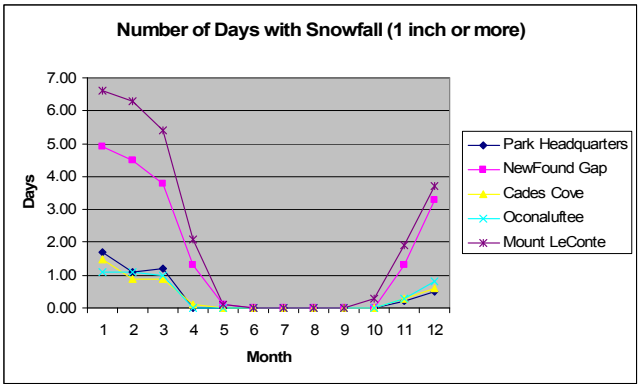


Only NewFound Gap and Mount LeConte reported snowfall in the months of May and October. The earliest snowfall for NewFound Gap is October 25th, which occurred in 2005, with 1.5 inches. The earliest for Mount LeConte is October 19th, which occurred in 1996, with 0.1 inch. The latest snowfall for both NewFound Gap and Mount LeConte occurred on May 8-9th, 1992 with 4 and 12.5 inches, respectively.

	Knoxville Airport	Tri-City Airport	Park Headquarters	Cades Cove	Oconaluftee	Asheville Airport	New-Found Gap	Mount Le-Conte
Jan	3.70	5.50	4.36	3.99	3.03	4.30	17.99	25.28
Feb	3.00	4.10	2.13	1.90	1.90	4.10	13.16	20.42
Mar	1.60	1.90	3.15	3.51	4.82	3.10	15.57	24.80
Apr	0.80	0.90	0.40	0.13	0.00	1.00	2.92	7.46
May	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.83
Oct	0.00	0.10	0.00	0.00	0.00	0.00	0.10	0.43
Nov	0.10	0.30	0.20	0.30	1.37	1.00	3.28	6.15
Dec	0.70	2.20	1.47	1.50	1.98	2.20	11.49	15.28

The latest first snowfall in the park occurred in Winter of 2001-2002. Mount LeConte did not receive its first measurable snow until December 24th, 2001 with only 0.5 inch. NewFound Gap did not receive any measurable snow until January 7th, 2002.

The greatest number of days with snowfall of 1 inch or more is at the Mount LeConte station with an average of 7 days for the month of January (Fig. 6). NewFound Gap's greatest number of days with snowfall of 1 inch or more is 4.9 for the month of January. This number is comparable to the normal number of days of snowfall for January at Minneapolis Saint Paul, Minnesota, which is 4.5. The lower elevations stations, such as the Park Headquarters and Cades Cove, average between 1 and 1 ½ days of 1 inch or more of snowfall for January through March. This is comparable to both the Tri-City and Asheville Airports.



The greatest daily snowfall for each of the park stations was reported during the March 13-14th, 1993 Super-storm. Mount LeConte received over 30 inches on March 14th, 1993

Conclusions

The GSMNP has its own unique climatology with average snowfall varying greatly across the park. It is crucial for the visitors of the GSMNP to have an understanding of these wide variations in snowfall climatology across the park, especially the difference in average snowfall between Park Headquarters and the higher elevation locations, such as NewFound Gap and Mount LeConte.

Visitors of the GSMNP can get a false sense of security by the usually limited snowfall across the southern United States, but then get caught off guard by the potential heavy snowfalls over the higher terrain. Travelers and hikers through the NewFound Gap should realize that the average snowfall is 62 inches, which is more than Boston, Massachusetts with an average of 43.8 inches or Chicago, Illinois with an average of 38 inches. The number of days per year with 1 inch of more of snowfall is also much greater at NewFound Gap with 19 days, then both Boston, Massachusetts and Chicago, Illinois which each average around 12 days.

The snowfall climatology at Mount LeConte is similar to Caribou, Maine. Both locations have an average annual snowfall around 100 inches with the average number of days per year with 1 inch or more of snow around 26 at Mount LeConte and 29 at Caribou, Maine.